

20
Spinal cord from a case of tetanus following ovariectomy.

By VINCENT HARRIS, M.D., and ALBAN DORAN.

ON November 28th, 1879, Dr. Bantock removed a unilocular par-ovarian cyst from a robust young countrywoman, æt. 24, at the Samaritan Hospital. The pedicle was found to be twisted; it was readily secured by a single ligature. The patient was removed, on the fourth day after the operation, to another ward, and placed in a bed between a window and the fireplace. She progressed very favorably until the morning of the seventh day, when she complained of stiffness of the muscles of mastication on the side of the face which was turned towards the window. Her bed was moved, but undoubted symptoms of trismus and tetanic spasms of the sterno-mastoids and trapezii developed themselves before nightfall. By the next morning the attacks of trismus had become very frequent, and added to them was very severe spasm of the inspiratory muscles, so that during each paroxysm the thorax remained violently expanded; on the other hand, there was little opisthotonos, and the muscles of the abdomen and lower extremities were hardly affected. The patient died asphyxiated at the end of the second day of the tetanic symptoms, and the eighth after ovariectomy. To alleviate her sufferings, chloroform had been freely administered, and within twelve hours of her death she had taken sixty grains of chloral and two drachms of tincture of Indian hemp by enemata, as well as two thirds of a grain of extract of Calabar bean hypodermically. The effects produced by these drugs were very transient.

The case occurred during the intense cold of the past winter, and the *post-mortem* examination was made twelve hours after death in a room the temperature of which was 20° F.; the body had lain there for several hours. The cord was immediately removed, stripped of its membranes, and notched by the scalpel at intervals of two or three inches. It was then placed in Müller's fluid, and afterwards hardened in chromic acid and spirit. In the cervical and upper dorsal region the distinction between the grey and the white matter did not appear so plain as in a normal specimen. The posterior columns and the entire grey matter were here very red. There was deep congestion of the pia mater between the origins of the pos-

terior roots throughout the cord; internally the lumbar region appeared, to the naked eye, quite normal.

About forty sections of the cord were made by Dr. Harris; Williams' apparatus was employed for the purpose. They were examined separately by us, together with sections of normal cord, and on comparing notes we have agreed upon the following conclusions with regard to the appearances observed in these preparations.

In the lumbar region the sections appear almost normal; the connective tissue and axis cylinders of the white columns show distinctly; the ganglion cells of the grey matter are very perfect and surrounded by a wide space. The central canal is very wide in nearly all the sections, and lined with a distinct layer of columnar epithelium, under which are great numbers of nuclei, extending in some specimens for a considerable distance along the grey commissure. In some examples these nuclei are so abundant as to cause the epithelial lining of the canal to bulge prominently into its lumen. Such nuclei are now admitted to be part of the neuroglia, but in healthy cords they are never found in such numbers as in these specimens.¹ This great abundance denotes morbid proliferation, especially when the still more evidently abnormal condition of the cervico-dorsal portion of the grey commissure comes to be considered. A proliferation is simulated when the razor has detached more epithelial cells than actually belong to the portion of the canal included in the section, the cells being torn from an adjacent part of the canal. The tops of these displaced cells are then seen projecting into the lumen of the canal or pressed backwards against the surrounding tissue, so as to mingle with the neuroglia nuclei, from which they can be so clearly distinguished as to prevent all fallacy; moreover, in this case they do not lie in the same focus as the nuclei. In some of the sections dilated vessels can be detected, especially in the anterior columns, close to the median fissure.

The sections taken from the lower cervical, and still more those from the upper dorsal region, are more evidently morbid. They all appear more or less unsymmetrical. In none is there any complete breaking down of grey or white matter; several sections exhibit large patches of transparent homogeneous material, which have not become stained; they are apparently identical with

¹ See Klein and Noble Smith, 'Atlas of Histology,' plate xix, fig. 3.

Clarke's "transparent patches,"¹ Dickinson's "transparent exudation,"² and Coats's "area, in which the nerve-fibres and connective tissue do not take on the carmine."³ An examination of another tetanic cord sent to us by a distinguished surgeon confirms our belief that these transparent patches are the result of partial decomposition. This cord was sent to us in a weak solution of spirit, but the membranes had not been removed nor the cord notched. A vain attempt was made to thoroughly harden this cord; the few sections that could be prepared all presented numerous transparent blotches, which it was found impossible to colour by any medium. Hence, in the ovarian case, the few sections where these patches could be seen were probably from a part of the cord too far from some of the notches made into it to allow perfect permeation of the hardening medium.

The appearance of the grey commissure immediately surrounding the central canal in the upper dorsal region was as follows:—Here morbid changes are more advanced than in the lower part of the cord. The want of symmetry seen in the entire section extends to its central canal, across which there passes a band of homogeneous yellowish material, apparently continuous with the protoplasm of the epithelium, with which it is connected at both ends. It bears three or four nuclei in its broader portion; these are probably derived from the epithelium. The neuroglia-nuclei are, in most of the sections from the upper part of the cord, as abnormally abundant as in the lumbar region; in the specimen here figured they appear less conspicuously numerous. The band across the canal was found in eleven sections, all from the upper dorsal region, and all free from transparent patches. It appears to be exudation thrown off from the epithelium, and probably represents an inflammatory condition, which was commencing to spread down to the lumbar region when the patient died. The vessels in the grey commissure posterior to the canal are much distended in all specimens where the canal is traversed by the band above referred to, and the lymph spaces round them appear wider than usual.

In the cervico-dorsal sections the fine reticulated stroma of the anterior columns shows irregular thickening of its interlacing fibres,

¹ 'Med.-Chir. Trans.,' vol. xlviii, pp. 258, 259.

² Ibid., vol. li.

³ Ibid., vol. lxi, p. 82.

most marked towards the *cul-de-sac* of the anterior median fissure, where the stroma is in parts converted into a solid granular material; in this the nerve-fibres are imbedded; some of them remain perfect, but most are disintegrated. In several specimens a similar change can be seen in the posterior columns close to the grey commissure. The alteration in the stroma appears to commence by thickening of the fibres, followed by exudation. The lateral columns remain normal. In the anterior cornua the vessels are, in most specimens, dilated, and leucocytes surround some of them in great numbers. The ganglion cells are mostly well formed, and surrounded by wide spaces, but in several cases they are shrunken, ill-defined, and not separated from the stroma by any space. In the tractus intermediolateralis the cells are mostly distinct; in the posterior cornua they appear in many specimens altered, as in the anterior. This shrinking of the ganglion cells has already been observed by Dr. Ross, and described in the thirtieth volume of the Society's 'Transactions' (p. 217). The thickening of the stroma in the posterior columns causes the fibres of the posterior roots of the spinal nerves to appear very indistinct, or to disappear entirely, at the part where they sweep round the posterior towards the inner aspect of the posterior cornua.

At the *post-mortem* examination of this case the pedicle of the tumour was found to be undergoing the normal changes which follow complete intra-peritoneal ligature. The broad ligament was split and dissected up as far as the ligature, but no bruised nor enlarged nerves could be detected by the pocket-lens. The ligature itself had been drawn very tightly, the distal and proximal sides of the stump of the pedicle had bulged over the constricting silk and become united by adhesions, which prevented sloughing of the distal portion. Olshausen¹ gives a table of twenty-four cases of tetanus following ovariectomy, and we find that one operator lost seven out of a total of twenty-nine cases from this deadly complication. There is strong evidence that this high mortality was due to irritation of the pedicle by retained harelip pins and to its frequent disturbance, partly perhaps through the over-anxiety of the surgeon, but in some cases through secondary hæmorrhage, which indicates, according to Olshausen, an insufficient tightness

¹ "Krankheiten der Ovarien," Pitha u. Billroth, 'Handbuch der allgemeinen u. speciellen Chirurgie,' Band iv, Lief. 6, p. 367.

of the clamp, so that the nerves of the pedicle were not so thoroughly crushed as to be rendered powerless in exerting morbid reflex action.

On the other hand, the pedicle had been very tightly ligatured in the case from which these sections were taken. It is most probable that the tetanus was not caused by irritation of the nerves of the pedicle, but from the influence of a draught on the patient's cheek, which induced inflammatory changes in the cord, partly as an interstitial inflammation, partly as a kind of catarrh of the lining membrane of the central canal.

That these changes may be found as the result of other diseases, we have no doubt, nor shall we be surprised if many consider them as artificially produced by media employed in hardening and staining the sections, or as the result of decomposition. The fact that exudations, dilated vessels, and abnormal appearances about the central canal are observed in affections differing from tetanus does not of itself prove that similar conditions may not exist in this disease. Indeed, its clinical symptoms do not encourage us in the expectation of finding any specific change in the cord, which, on the other hand, we feel must be the structure partly if not chiefly at fault. As for artificial appearances, we fail to observe the above-described changes in any of the numerous sections of normal cord which we have prepared in precisely the same manner as these specimens, whilst we have rejected all belief in the morbid nature of the transparent patches seen in a few of the sections since we have found such patches constant, and widely diffused over sections taken from a cord evidently decomposed. These alterations, the source of which is so evident, are very different from those to which we call attention, namely the dilated vessels, the interstitial exudation, and the singular changes around the central canal. Hence the opinion that these changes are truly morbid seems far more reasonable than the hypothesis that they are produced by chromic acid, decomposition, or logwood.

April 6th, 1880.

H. E. Taylor "Typhoid Infection of Curian
Eyes" Med. Soc. Lond. meeting July 3, 1877
Trans. Med. Soc. Vol 49. (Reference entered here
in error - should have been at end of preceding reprint
on "Typhoid Infection of Curian")

